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Survey of Known Laser Transitions*

by

H. J. Cook, W. B. Johnson and Marcia L. Parsons

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A survey of all known gaseous and solid laser lines has been made.* This survey was made to have at hand the range of wavelengths presently available which might be useful in laser spectroscopy and plasma diagnostics. The list contains approximately 700 lines of observed laser transitions of which the vast majority are transitions observed in gas lasers.

Of particular interest to plasma diagnostics are the lines due to highly ionized species of various atoms. It is conceivable that the techniques used to produce these lines could be employed to study the emission of ultra-violet radiation from various plasma devices such as the θ-pinch. The apparatus used for the initial observation of these lines was a high current capacitor discharge not too dissimilar to a mild longitudinal pinch experiment. It is conceivable that the power obtained in stimulated emission from machines such as the NRL Pharos could be rather impressive. Characteristic lines of these wavelengths could also be used in absorption to identify various ionized species within the plasma. At the other end of the wavelength spectrum are the new transitions in the infra-red

*Termination date of the survey was September 1, 1964.

and far infra-red, particularly certain transitions in xenon and the hydroxyl molecule. Specifically, these are

Xenon	OH
2.0268μ	54.7μ
2.6518	78.4
3.5080	118.8
5.5754	

These are extremely strong transitions which oscillate easily and on a continuous basis. Construction techniques are not too difficult. The far infra-red lines of OH give, for example, power levels in the milliwatt region, typical of powers available from good millimeter wave klystrons. This particular part of the spectrum is just beginning to be explored and there is every reason to believe that stimulated emission techniques will produce continuously oscillating lines throughout this portion of the spectrum and beyond. The application of laser techniques to spectroscopy will be explored in a subsequent report.

In making the survey the wavelengths were in most instances as reported in the literature. Some effort was made to make more precise wavelength presentations when available, particularly for the molecular nitrogen spectrum and other commonly observed rare gas transitions available

in standard compilations of observed wavelength tables. It became obvious after the survey was initiated that there is no unanimity among various laboratories and even among the same as to whether their wavelengths are as measured in air or corrected to vacuum values. In many cases the references do not state which is the case. For precision spectroscopy vacuum determinations are to be preferred and corrections to the observed data are desired.

The authors are particularly indebted to a number of workers in the laser field for their cooperation in communicating their work prior to publication. These are: Dr. W. B. Bridges - Hughes Research Laboratory, Dr. W. E. Bell - Spectra-Physics, Inc., Dr. C. K. N. Patel - Bell Telephone Laboratories, Dr. H. Herd and Mr. Frank Gaillard - Energy Systems, Inc., and Dr. R. Bleekrode - Phillips Eindhoven. Without their assistance the survey would be considerably diminished. Every attempt has been made to make the bibliography as complete as possible. Difficulties are encountered when a number of different groups report work on single transitions. It is not the purpose of this survey to give a historical account of the development of the laser field so that there are perhaps some workers whose names were either inadvertently left off or omitted because

of the press of numbers on the more commonly worked transitions. It has not been our intention to slight the work of any group. Acknowledgement is made to the Case Institute of Technology Research Fund and the National Aeronautics and Space Administration for their kind support of this work.

Elements and Molecules Used to Produce Laser Action in the Gas Phase

A I, A II, A III, A IV

Br I

C I, C II, C III

Cl I

Cs I

CN

CO

CO_2

He I

Hg I, Hg II

HCN

I I, I II

Kr I, Kr II, Kr III

N I, N II, N III, N IV

Ne I, Ne II, Ne III

O I, O II, O III

OD

OH

S I

Xe I, Xe II, Xe III

Ions Which Have Been Used to Produce Laser Action in a Host Material

Cr^{+3}

Dy^{+2}, Dy^{+3}

Eu^{+2}, Eu^{+3}

Gd^{+3}

Ho^{+3}

Nd^{+3}

Ni^{+2}

Pr^{+3}

Sm^{+2}

Tm^{+2}, Tm^{+3}

U^{+2}, U^{+3}

Yb^{+3}

Gas Lasers

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.2678	Ne III	Neon	$3p\,^3P_1 \rightarrow 3s\,^3S^o_1$ at .267864μ or $3p\,^3Po_1 2 \rightarrow 3s\,^3S^o_1$ at . 267790μ	Pulsed	85
.27536	A III	Argon		Pulsed	85
.277765	Ne III	Neon	$3p'\,^3D_3 \rightarrow 3s'\,^3D^o_3$	Pulsed	85
.2867		Neon		Pulsed Possibly Ne IV	85
.291300	A IV	Argon	$4p\,^2D^o_{3/2} \rightarrow 4s\,^2P_{1/2}$	Pulsed	85
.292627	A IV	Argon	$4p\,^2D^o_{3/2} \rightarrow 4s\,^2P_{1/2}$	Pulsed	85
.298385	Xe III	Xenon	$6p''32_1 \rightarrow 6s''3P^o_0$	Pulsed	85
.298461	O III	Air with noble gases or impurities	$4p\,^5P^o_2 \rightarrow 3d\,^3D_2$	Pulsed	85
.3002961	A II	Argon		Pulsed	85
.302405	A III	Argon	$4p''\,^3D_3 \rightarrow 4s''\,^3P^o_2$	Pulsed	85
.3047053	A II	Argon		Pulsed	85
.3050		Krypton		Pulsed	85
.305484	A III	Argon	$4p''\,^3D_2 \rightarrow 4s''\,^3P^o_1$	Pulsed	85

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.30797		Xenon		Pulsed, Possibly Xe IV	85
.323951	Kr III	Pure Krypton	$5p'\,^1D_2 \rightarrow 5s'\,^1P_1^o$		85
.330653	Xe III	Xenon	$nx'\,37_{2,3} \rightarrow 6p'\,^3P_3$	Pulsed	85
.3308		Xenon		Pulsed, Likely Xe IV	85
.33308		Xenon		Pulsed, Possibly Xe IV	85
.3309	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 2, V'' = 2$ Rotational Level	Unresolved triplets, Pulsed	84
.3314	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 2, V'' = 2$ Rotational Levels	Unresolved triplets, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.332377	Ne II	Neon	$3p^2P^o_{3/2} \rightarrow 3s^2P_{3/2}$	Pulsed	85
.332717	Ne II	Neon	$3p^4D^o_{3/2} \rightarrow 3s^4P_{3/2}$	Pulsed	85
.3331	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 2,\ V'' = 2$ Rotational Level	Unresolved triplets, Pulsed	84
.3341	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 1,\ V'' = 1$ Rotational Levels	Unresolved triplets, Pulsed	84
.334472	A III	Argon	$4p'\,^3f_3 \rightarrow 4s'\,^3D^o_2$	Pulsed	85
.3354	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 1,\ V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
335849	A III	Argon	$4p'\,^3f_2 \rightarrow 4s'\,^3D^o_1$	Pulsed	85
3359	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 1,\ V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84
.33613	A III	Argon	$4p'\,^3f_4 \rightarrow 4s'\,^3D^o_3$	Pulsed	85
.3365	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 1,\ V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84
.3367	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 1,\ V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.3369	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 1, V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84
.33713	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 0, V'' = 0$ Rotational Level	Unresolved triplets, Pulsed	84
.3373	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 0, V'' = 0$ Rotational Level	Unresolved triplets, Pulsed	84
.337496	Kr III	Krypton	$5p''\,^3D_3 \rightarrow 5s''\,^3P^o_2$	Pulsed	85
.337830	Ne II	Neon	$3p\,^2P^o_{1/2} \rightarrow 3s\,^2P_{1/2}$	Pulsed	85

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.3379	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 0,\ V'' = 0$ Rotational Levels	Unresolved triplets, Pulsed	85
.3382	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 0,\ V'' = 0$ Rotational Levels	Unresolved triplets, Pulsed	84
.3385	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 0,\ V'' = 0$ Rotational Levels	Unresolved triplets, Pulsed	84
.339286	Ne II	Neon	$3p^2P^o_{3/2} \rightarrow 3s^2P_{1/2}$	Pulsed	85

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.3397	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 0,\ V'' = 0$ Rotational Level	Unresolved triplets, Pulsed	84
.3412	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 0,\ V'' = 0$ Rotational Level	Unresolved triplets, Pulsed	84
.3446	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 4,\ V'' = 5$ Rotational Level	Unresolved triplets, Pulsed	84
.3457	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 4,\ V'' = 5$ Rotational Level	Unresolved triplets, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.3460	N_2	Pure N_2	N_2 second positive $C\,^3\pi \rightarrow B\,^3\pi$ $V' = 4,\ V'' = 5$ Rotational Level	Unresolved triplets, Pulsed	84
.3478	N_2	Pure N_2	N_2 second positive $C\,^3\pi \rightarrow B\,^3\pi$ $V' = 3,\ V'' = 4$ Rotational Level	Unresolved triplets, Pulsed	84
.3487	N_2	Pure N_2	N_2 second positive $C\,^3\pi \rightarrow B\,^3\pi$ $V' = 3,\ V'' = 4$ Rotational Level	Unresolved triplets, Pulsed	84
.35005	N_2	Pure N_2	N_2 second positive $C\,^3\pi \rightarrow B\,^3\pi$ $V' = 2,\ V'' = 3$ Rotational Level	Unresolved triplets, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.350742	Kr III	Pure Krypton	$5p\,^3P_2 \rightarrow 4s\,^3S^o_1$	Pulsed	85
.351112	A III	Argon	$4p\,^3P_2 \rightarrow 4s\,^3S^o_1$	Pulsed	85
.351418	A III	Argon	$4p\,^3P_1 \rightarrow 4s\,^3S^o_1$	Pulsed	85
.3543	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ V' = 1, V" = 2 Rotational Level	Unresolved triplets, Pulsed	84
.3552	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ V' = 1, V" = 2 Rotational Level	Unresolved triplets, Pulsed	84
.35769	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ V' = 0, V" = 1 Rotational Level	Unresolved triplets, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.357611	A II	Argon	$4d^4F^o_{7/2} \rightarrow 4p^4D_{5/2}$	Pulsed	85
.3623	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 0, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.363789	A II	Argon		Pulsed	85
.37052		Argon		Pulsed, Possibly Ar II, Ar III, O III	85
.374949	O III	Air with noble gases or impurities	$3p^4S^o_{3/2} \rightarrow 3s^4P_{5/2}$	Pulsed	85,99
.375467	O III	Air with noble gases or impurities	$3p^3D_3 \rightarrow 3s^3P^o_2$	Pulsed	85,99
.37554	N_2	Pure N_2	N_2 second positive $C^3\pi \rightarrow B^3\pi$ $V' = 1, V'' = 3$ Rotational Level	Unresolved triplets, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.375988	O III	Air with noble gases or impurities	$3p\,^3D_3 \rightarrow 3s\,^3P^o_2$	Pulsed	85,99
.37600	O III	Xenon and impurities	$3p\,^3D_3 \rightarrow 3s\,^3P^o_2$	Pulsed	85
.378097	Xe III	Xenon	$6p\,^3P_2 \rightarrow 6s\,^3S^o_1$	Pulsed	85
.379532	A III		$4p''\,^3D_3 \rightarrow 3d''\,^3P^o_2$	Pulsed	85
.38049	N_2	Pure N_2	N_2 second positive $C\,^3\pi \rightarrow B\,^3\pi$ $V' = 0, V'' = 2$ Rotational Level	Unresolved triplet, Pulsed	84
.385829	A III	Argon	$4p''\,^3D_2 \rightarrow 3d''\,^3P^o_2$	Pulsed	85
.39984	N_2	Pure N_2	N_2 second positive $C\,^3\pi \rightarrow B\,^3\pi$ $V' = 1, V'' = 4$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.406041	Xe III	Xenon	$6p''31_1 \rightarrow 5d''25^o_1$	Pulsed	85
.406737	Kr III	Krypton	$5p''F_3 \rightarrow 5s''D^o_2$	Pulsed	85
.40889		Argon		Pulsed, Possibly O II at .4089295 $4f^4G^o_{11/2} \rightarrow 3d^4f_{9/2}$	85
.413133	Kr III	Pure Krypton	$5p^5P_2 \rightarrow 5s\,^3S^o_1$	Pulsed	85
.414671	A III	Argon	$4p'\,^3P_2 \rightarrow 4s''\,^3P^o_2$	Pulsed	85
.415444	Kr III	Krypton	$5p'\,^3F_3 \rightarrow 5s'\,^1D^o_2$	Pulsed	85
.417179	Kr III	Pure Krypton	$5p^5P' \rightarrow 5s\,^3S^o_1$	Pulsed	85
.418292	A II (?)	Argon		Pulsed	85
.421401	Xe III	Xenon	$6p'\,^3P_2 \rightarrow 5d'\,^3D''_3$	Pulsed	85
.422658	Kr III	Krypton	$5p'\,^3F_2 \rightarrow 4d'\,^3D^o_1$	Pulsed	85
.424024	Xe III	Xenon	$6p'\,^1P_2 \rightarrow 5d''17^o_3$	Pulsed	85
.427259	Xe III	Xenon	$6p'\,^3F_4 \rightarrow 5d'\,^3D^o_3$	Pulsed	85
.428588	Xe III	Xenon	$6p'\,^3D_2 \rightarrow 6s''D^o_2$	Pulsed	85
.430585	Xe III	Xenon	$6p'\,^3D_3 \rightarrow 5d'\,^3D^o_3$	Pulsed	85

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.434738	O II	Air with noble gases or impurities	$3p'\,{}^2D^o_{3/2} \rightarrow 3s'\,{}^2D_{3/2}$	Pulsed	85,99
.435128	O II	Air with noble gases or impurities	$3p'\,{}^2D^o_{5/2} \rightarrow 3s'\,{}^2D_{5/2}$	Pulsed	85,99
.437075	A II	Argon	$4p'\,{}^2D^o_{3/2} \rightarrow 3d\,{}^2D_{3/2}$	Pulsed	85
.441488	O II	Air with noble gases or impurities	$3p\,{}^2D^o_{5/2} \rightarrow 3s\,{}^2P_{3/2}$	Pulsed	85,99
.441697	O II	Air with noble gases or impurities	$3p\,{}^2D^o_{3/2} \rightarrow 3s\,{}^2P_{1/2}$	Pulsed	85,99
.443415	Xe III	Xenon	$5p'\,{}^3F_2 \rightarrow 5d'\,{}^3D^o_1$	Pulsed	85
.444329	Kr III	Krypton	$5p'\,{}^3D_2 \rightarrow 4d'\,{}^3D^o_1$	Pulsed	85
.454508	A II	Argon or a mixture with other rare gases	$4p\,{}^2P^o_{3/2} \rightarrow 4s\,{}^2P_{3/2}$	Pulsed and CW	6, 63, 26, and 85
.45772	Kr II	Pure Krypton	$5p'\,{}^2F^o_{7/2} \rightarrow 5s\,{}^2P_{3/2}$	Pulsed	84, 85
.457934	Ar II	Argon or a mixture with other rare gases	$4p\,{}^2S^o_{1/2} \rightarrow 4s\,{}^2P_{1/2}$	Pulsed and CW	75, 84, and 26

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.460302	Xe II	Xenon	$6p\,^4D^o_{3/2} \rightarrow 6s\,^4P_{3/2}$	Pulsed and CW	75, 84, and 26
.460955	A II	Argon	$4p'\,^2F^o_{7/2} \rightarrow 4s'\,^2D_{5/2}$	Pulsed	85
.461915	Kr II	Pure Krypton	$5p\,^2D^o_{5/2} \rightarrow 5s\,^2P_{3/2}$	Pulsed	84, 85
.463388	Kr II	Pure Krypton	$5p'\,^2F^o_{5/2} \rightarrow 5s'\,^2D_{3/2}$	Pulsed	84, 85
.46453		Argon		Pulsed	85
.46474		Air, Xe, Kr		Pulsed, Possibly C III (.464740) $3p\,^3P^o_2 \rightarrow 3s\,^3S_1$	85,99
.464914	O II	Air with noble gases or impurities	$3p\,^4P^o_{7/2} \rightarrow 3s\,^4P_{5/2}$	Pulsed	85
.4650	C III	CO dissociation	$3p\,^3P^o_2 \rightarrow 3s\,^3S_1$	Pulsed,	84,99
.465016	Kr III or C III	Krypton	$5p\,^2P^o_{1/2} \rightarrow 5s\,^4P_{1/2}$ or $3p\,^3P^o_1 \rightarrow 3s\,^3S_1$	Pulsed, Assignment in doubt	85
.465040		Xenon	Possibly O II .4650841 μ $3p\,^4D^o_{1/2} \rightarrow 3s\,^4P_{1/2}$	Pulsed	85

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.465794	A II	A_2	$4p^2P^o_{1/2} \rightarrow 4s^2P_{3/2}$	Pulsed and CW	26, 63, 84 and 75
.467368	Xe III	Xenon	$6p'^1F_3 \rightarrow 6s'^1D^o_2$	Pulsed	85
.468041	Kr II	Pure Krypton	$5p^2S^o_{1/2} \rightarrow 5s^2P_{1/2}$	Pulsed	84, 85
.468354	Xe III	Xenon	$6p^5P_2 \rightarrow 6s^3S^o_1$	Pulsed	85
.472691	Ar II	Pure Argon or a mixture with noble gases	$4p^2D^o_{3/2} \rightarrow 4s^2P_{3/2}$	Pulsed and CW	6, 63, and 84
.476222	Hg II	Hg		Pulsed	69
.476243	Kr II	Pure Krypton	$5p^2D^o_{3/2} \rightarrow 5s^2P_{1/2}$	Pulsed	84, 85
.476489	Ar II	Pure Argon or a mixture of noble gases	$4p^2P^o_{3/2} \rightarrow 4s^2P_{1/2}$	Pulsed and CW	6, 63, 26 and 84
.476574	Kr II	Pure Krypton	$5p^4D^o_{5/2} \rightarrow 5s^4P_{3/2}$	Pulsed	84, 85
.4768672	A I	Argon			69
.482518	Kr II	Pure Krypton	$5p^4S^o_{3/2} \rightarrow 5s^2P_{1/2}$	Pulsed	84, 85
.484659	Kr II	Krypton	$5p^2P^o_{1/2} \rightarrow 5s^2P_{3/2}$	Pulsed	85
.486946	Xe III	Xenon	$6p'^3F_3 \rightarrow 5d'D^o_2$	Pulsed	85
.487990	A I	Pure Argon	$4s^2P_{3/2} \rightarrow 4p^2D^o_{5/2}$	CW	26, 84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.487990	A II	Pure Argon or a mixture with noble gas	$4p\,^2D^o_{5/2} \rightarrow 4s\,^2P_{3/2}$	CW	6, 63, 84 and 85
.488906	A II	Pure Argon	$4p\,^2P_{1/2} \rightarrow 4s\,^2P_{1/2}$	Pulsed	85
.495410		Xenon	Possibly C II at .495417μ $3d\,^2P^o_{1/2} \rightarrow 3p\,^2P_{1/2}$	Pulsed	85
.496508	Xe II	Xenon	$7s'\,^2D_{3/2} \rightarrow 6p'\,^2P^o_{3/2}$	Pulsed	85
.496512	A II	Argon	$4p\,^2D^o_{3/2} \rightarrow 4s\,^2P_{1/2}$	CW	6, 26, 84 and 85
.497271	Xe II	Pure Xenon		CW	84
.500772		Xenon	Possibly N II at . 5007316 $3d\,^3P^o_2 \rightarrow 3p\,^3S_1$	Pulsed	85
.501218	Xe II	Pure Xenon		CW	84
.501716	A II	Argon or a mixture with noble gases	$4p\,^2F^o_{5/2} \rightarrow 3d\,^2D_{3/2}$	CW	6, 26, 69, 84 and 85
.504492	Xe II	Pure Xenon	$6p'\,^2P^o_{1/2} \rightarrow 6s'\,^2D_{3/2}$	CW	84, 85
.514178	A II	Argon	$4p'\,^2F^o_{7/2} \rightarrow 3d\,^2D_{5/2}$	Pulsed	85
.514536	A II	Pure Argon or a mixture of noble gases	$4s\,^2P_{3/2} \rightarrow 4p\,^4D^o_{5/2}$	CW	26, 63, and 84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.515904	Xe II (?)	Xenon		Pulsed, Strong line	85
.518811	Xe II	Pure Xenon		CW	84
.520832	Kr II	Pure Krypton	$5p^4P^o_{3/2} \rightarrow 5s^4P_{3/2}$	Pulsed	84, 85
.523894	Xe III	Xenon	$6p'^3P_2 \rightarrow 5d''13^o_1$	Pulsed	85
.526017	Xe II (?)	Xenon		Pulsed, Strong line, Possibly Xe II at .525989μ	85
.526195	Xe II	Pure Xenon	$6p'^2D^o_{3/2} \rightarrow 6s'^2D_{3/2}$	CW	84, 85
.528692	A II	Pure Argon or a mixture with noble gases	$4p^4D^o_{3/2} \rightarrow 4s^2P_{1/2}$	Pulsed	6, 63, and 85
.530866	Kr II	Pure Krypton	$5p^4P^o_{5/2} \rightarrow 5s^4P_{3/2}$	Pulsed	84, 85
.533938	Xe II	Pure Xenon		CW	84
.535289	Xe III	Xenon		Pulsed	85
.539459	Xe II (?)	Xenon		Pulsed Strong line, Xe I line at .539438μ	85
.541915	Xe II	Pure Xenon	$6p^4D^o_{5/2} \rightarrow 6s^4P_{3/2}$	CW	84, 85

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.550220	A II	Pure Argon	$4p'\,^3D_3 \rightarrow 4s''\,^3P^o_2$	Pulsed	85
.55906	CO	CO	Angstrom Series $B'\Sigma \rightarrow A'\pi$ $V' = 0,\ V'' = 2$ Rotational Level Q(11)	Pulsed	84, 86
.559237	O III	Air with noble gas or impurities	$3p\,^1P_1 \rightarrow 3s\,^1P^o_1$	Pulsed	85, 99
.55934	CO	CO	Angstrom Series $B'\Sigma \rightarrow A'\pi$ $V' = 0,\ V'' = 2$ Rotational Level Q(10)	Pulsed	84, 85
.55960	CO	CO	Angstrom Series $B'\Sigma \rightarrow A'\pi$ $V' = 0,\ V'' = 3$ Rotational Level Q(9)	Pulsed	84, 86

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.55983	CO	CO	Angstrom Series $B^1\Sigma \rightarrow A^1\pi$ $V' = 0, V'' = 3$ Rotational Level Q(8) or R(13)	Pulsed	84, 86
.56004	CO	CO	Angstrom Series $B^1\Sigma \rightarrow A^1\pi$ $V' = 0, V'' = 3$ Rotational Level Q(7)	Pulsed	84, 86
.56025	CO	CO	Angstrom Series $B^1\Sigma \rightarrow A^1\pi$ $V' = 0, V'' = 3$ Rotational Level Q(6)	Pulsed	84, 85
.56038	CO	CO	Angstrom Series $B^1\Sigma \rightarrow A^1\pi$ $V' = 0, V'' = 3$ Rotational Level Q(5)	Pulsed	84, 86

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.567717	Hg II	Hg-He	$5f^2F_{7/2} \rightarrow 6d^2D_{5/2}$ or $5f_{7/2} \rightarrow 6dD_{5/2}$	Pulsed	2, 81, and 84
.56796		Air	Possibly N II at .567956μ $3p\,^3D_3 \rightarrow 3s\,^3P^o_2$	Pulsed	85
.568189	Kr II	Pure Krypton	$5p^4D^o_{5/2} \rightarrow 5s^2P_{3/2}$	Pulsed	84, 85
.5690	Ionized Oxygen(?)	Oxygen		Pulsed	84
.5697	Ionized Nitrogen(?)	N_2		Pulsed	84
.5760726	I II	Ne-I		Pulsed	84
.5853		Neon-Argon (Helium)	Possibly Ne I at .5852488μ $2p_1 \rightarrow 1S_2$	Pulsed	85
.5939319	Ne I	Ne-He		CW	84
.595573		Air, Xenon		Pulsed, Emitter unknown	85
.597113	Xe II	Pure Xenon	$6p'\,^2P^o_{3/2} \rightarrow 6s'\,^2D_{3/2}$		84, 85
.6046158	Ne I	He-Ne		CW	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.60629	CO	CO	Angstrom Series	Pulsed	84, 86
			$B'\Sigma \rightarrow A'\pi$		
			$V' = 0,\ V'' = 4$		
			Rotational Levels Q(9)		
.60657	CO	CO	Angstrom Series	Pulsed	84, 86
			$B'\Sigma \rightarrow A'\pi$		
			$V' = 0,\ V'' = 4$		
			Rotational Level Q(8)		
.60682	CO	CO	Angstrom Series	Pulsed	84, 86
			$B'\Sigma \rightarrow A'\pi$		
			$V' = 0,\ V'' = 4$		
			Rotational Level Q(7)		
.60705	CO	CO	Angstrom Series	Pulsed	84, 86
			$B'\Sigma \rightarrow A'\pi$		
			$V' = 0,\ V'' = 4$		
			Rotational Level Q(6)		

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.60725	CO	CO	Angstrom Series	Pulsed	84, 86
			$B'\Sigma \rightarrow A'\pi$		
			$V' = 0$, $V'' = 4$		
			Rotational Level Q(5)		
.60742	CO	CO	Angstrom Series	Pulsed	84, 86
			$B'\Sigma \rightarrow A'\pi$		
			$V' = 0$, $V'' = 4$		
			Rotational Level Q(4)		
.6118027	Ne I	He-Ne	$3s_2 \rightarrow 2P_6$	CW	5, 84
.6127464	I II	He-I		Pulsed	84
.614950	Hg II	Hg-He	$7p^2P_{3/2} \rightarrow 7s^2S_{1/2}$	Pulsed	2, 81, and 84
			or		
			$7p_{3/2} \rightarrow 7s_{1/2}$		
.6182146	Ne I	He-Ne	$3s_5 \rightarrow 2p_9$	CW	28
.6213878	Ne I	He-Ne	$3s_4 \rightarrow 2p_8$	CW	28

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.627082	Xe II	Pure Xenon	$6p'^2F^o_{5/2} \to 6s'^2D_{3/2}$	CW	84, 85
.6293766	Ne I	He-Ne	$3s_2 \to 2p_5$	CW	5, 84
.6313692	Ne I	He-Ne	$3s_3 \to 2p_5$	CW	28
.6328173	Ne I	He-Ne	$3s_2 \to 2p_4$	CW	16
.6351873	Ne I	He-Ne	$3s_2 \to 2p_3$	CW	28, 84
.6401076	Ne I	He-Ne	$3s_2 \to 2p_2$	CW	5
.6402455	Ne I	He-Ne	$3s_1 \to 3p_2$	CW	44
.647089	Kr II	Pure Krypton	$5p^4P^o_{5/2} \to 5s^2P_{3/2}$	Pulsed	84, 85
.657007	Kr II	Pure Krypton	$5p'^2D^o_{5/2} \to 4d^2F_{5/2}$	Pulsed	84, 85
.657745		Helium, Neon	Possibly O III at .657750µ $3d^5f_2 \to 4d^3D^o_3$ or C II at .657803µ $3^2P^o_{3/2} \to 3^2S_{1/2}$	Pulsed	85
.65955.	CO	CO	Angstrom Series $B'\Sigma \to A'\pi$ $B' = 0$, $V'' = 5$ Rotational Level Q(10)	Pulsed	84, 86

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.65995	CO	CO	Angstrom Series $B'\Sigma \rightarrow A'\pi$ $V' = 0, V'' = 5$ Rotational Level Q(9)	Pulsed	84, 86
.66031	CO	CO	Angstrom Series $B'\Sigma \rightarrow A'\pi$ $V' = 0, V'' = 5$ Rotational Level P(13) or Q(8)	Pulsed	84, 86
.66064	CO	CO	Angstrom Series $B'\Sigma \rightarrow A'\pi$ $V' = 0, V'' = 5$ Rotational Level Q(7)	Pulsed	84, 86
.66091	CO	CO	Angstrom Series $B'\Sigma \rightarrow A'\pi$ $V' = 0, V'' = 5$ Rotational Level Q(6)	Pulsed	84, 86

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.66115	CO	CO	Angstrom Series $B'\Sigma \rightarrow A'\pi$ $V' = 0,\ V'' = 5$ Rotational Level Q(5)	Pulsed	84, 86
.66135	CO	CO	Angstrom Series $B'\Sigma \rightarrow A'\pi$ $V' = 0,\ V'' = 5$ Rotational Level Q(4)	Pulsed	84, 86
.676443	Kr II	Pure Krypton	$5p^4P^o_{1/2} \rightarrow 5s^2P_{1/2}$	Pulsed	84, 85
.687085	Kr II	Pure Krypton	$5p'^2F^o_{5/2} \rightarrow 4d^2P_{3/2}$	Pulsed	84, 85
.730482	Ne I	He-Ne		CW	84
.734637	Hg II	Hg-He	$7d_{5/2} \rightarrow 7p_{3/2}$	Pulsed	30, 81, 84
.7504		Argon-Neon (Helium)	Possibly A I at .75038676	Pulsed	85
.7568	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.7578	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 3,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7580	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 3,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7583	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 3,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7586	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 3,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.7590	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7597	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7601	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7611	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.7616	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 3, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7621	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 3, V'' = 1$ Rotational Level	Unresolved triplet Pulsed	84
.7623	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 3, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7705	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 3, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.7715	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7729	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7735	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7741	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.7745	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3$, $V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.7750	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 3$, $V'' = 1$ Rotational Level	Unresolved triplet. Pulsed	84
.7759	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2$, $V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.7769	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2$, $V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.7781	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.7788	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.7792	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.7797	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.799322	Kr II	Pure Krypton	$5p^4P^o_{3/2} \rightarrow 4d^4D_{1/2}$		84
.844628	Br	Br_2 + Ar	$5p^4D_{3/2} \rightarrow 5s^4P_{3/2}$	CW	37
.844637	O	O_2 + Ne or O_2 + Ar	$3p^3P_2 \rightarrow 3s^3S^o_1$	CW	37
.844638	Br	Br_2 + Ar	$5p^4D_{3/2} \rightarrow 5s^4P_{3/2}$	CW	37
.844670	Br	Br_2 + Ar	$5p^4D_{3/2} \rightarrow 5s^4P_{3/2}$	CW	37
.844679	Br	Br_2 + Ar	$5p^4D_{3/2} \rightarrow 5s^4P_{3/2}$	CW	37
.85482	Hg II	Hg - He	$5g \rightarrow C$	Pulsed	30, 81
.8628	Hg II (?)	Hg - He		Pulsed, Emitter not definitely determined	30, 81
.8647	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8650	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.8652	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.8658	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.8663	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8668	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.8674	N_2	Pure N_2	N_2 frist positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.8677	Hg (?)	Hg-He		Pulsed, Emitter not definitely identified	30, 81
.86835	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	82, 84
.8688	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.86912	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	82, 84
.8694	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84
.86980	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	82, 84
.8702	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8703	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84
.87044	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	82, 84
.8707	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplets,	84
.87099	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	82, 84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8713	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84
.8715	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84
.8717	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84
.8720	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 2,\ V'' = 1$ Rotational Level	Unresolved triplets, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8721	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.8722	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 2, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
.8831	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.8839	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet,	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8841	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.88440	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.8846	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.88478	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8849	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.88523	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.8854	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' =1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.88563	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8858	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.86625	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82, 84
.8664	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.8865	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82, 84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8867	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.88711	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.8876	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.88790	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82, 84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8883	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 1,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.8888	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 1,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.8890	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 1,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.88927	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 1,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8896	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 1,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.88989	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 1,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82
.8901	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 1,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
.8904	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 1,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.8907	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
89093	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 1, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82, 84
.9396	Hg II	Hg-He	$10s_{1/2} \rightarrow 8p_{3/2}$	Pulsed	30, 81
1.0413	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
1.0418	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0, V'' = 0$ Rotational Level	Unresolved triplet,	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
1.0432	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 0,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
1.0437	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 0,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
1.04493	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 0,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84, 82
1.0455	S I	SF_6 + He	$4p\,^3P_2 \rightarrow 4s\,^3S^o_1$		37
1.04612	N_2	Pure N_2	N_2 first positive $B\,^3\pi \rightarrow A\,^3\Sigma$ $V' = 0,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
1.04723	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82, 84
1.0478	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	84
1.04800	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82, 84
1.04909	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0, V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82, 84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
1.04948	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82, 84
1.05052	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0,\ V'' = 0$ Rotational Level	Unresolved triplet, Pulsed	82, 84
1.0586	Hg II	Hg-He	$8s_{1/2} \rightarrow 7p_{3/2}$	Pulsed	30, 84
1.0628	S I	SF_6 + He	$4p'\,{}^1F_3 \rightarrow 4s'\,{}^1P^o_2$		16, 37
1.0689	C I	Co or CO_2 with He or Ne	$3p\,{}^3D_3 \rightarrow 3s\,{}^3P^o_2$		37
1.079812	Ne I	He-Ne	$2s_3 \rightarrow 2p_7$	CW	9
1.0845	Ne I	Ne or He-Ne	$3p_5 \rightarrow 4s_4$ or $2s_2 \rightarrow 2p_6$ Possibly 1.084554 ($3p_5 \rightarrow 4s_4$)	CW	21, 84 and 34

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
1.1143	Ne I	He-Ne	$2s_4 \rightarrow 2p_8$	CW	16
1.117687	Ne I	He-Ne	$2s_5 \rightarrow 2p_9$	CW	21, 12, and 84
1.1181	Hg II	Hg-He	$7g \rightarrow 6f_{5/2}$	Pulsed	30
1.1390	Ne I	He-Ne	$2s_5 \rightarrow 2p_8$	CW	16
1.1409	Ne I	He-Ne		CW	21
1.152382	Ne I	He-Ne Pure Ne	$2s_2 \rightarrow 2p_4$	CW	78, 84, and 16
1.1601	Ne I	He-Ne		CW	21
1.161415	Ne I	He-Ne	$2S_3 \rightarrow 2P_5$	CW	16, 84
1.167	Ne I	He-Ne		CW	72
1.176687	Ne I	He-Ne	$2s_2 \rightarrow 2P_2$	CW	34, 9, 16, and 84
1.198499	Ne I	He-Ne	$2s_3 \rightarrow 2p_4$	CW	16, 34, and 84
1.206638	Ne I	He-Ne	$2s_5 \rightarrow 2p_6$	CW	12, 21, and 84
1.2220	Hg II	Hg + Ar		Pulsed	35, 84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
1.2303	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
1.2312	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
1.2319	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
1.2334	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0,\ V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
1.2347	N_2	Pure N_2	N_2 first positive $B^3\pi \rightarrow A^3\Sigma$ $V' = 0, V'' = 1$ Rotational Level	Unresolved triplet, Pulsed	84
1.2460	Hg II	Hg + Ar		Pulsed	35, 84
1.2545	Hg (?)	Hg-He	Emitter not positively identified	Pulsed	30
1.269	Ne I	He-Ne			70
1.2760	Hg II	Hg + Ar		Pulsed	35, 84
1.2981	Hg (?)	Hg-He	Emitter not positively identified	Pulsed	30
1.3583	N I	NO or NO_2 with He or Ne	$3p^2S^o_{1/2} \rightarrow 3s^2P_{3/2}$	CW	37
1.3655	Hg (?)	Hg-He	Emitter not positively identified	Pulsed	30
1.4276	Ne I	He-Ne		CW	21
1.4304	Ne I	He-Ne		CW	21
1.4321	Ne I	He-Ne		CW	21

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
1.4330	Ne I	He-Ne		CW	21
1.4346	Ne I	He-Ne		CW	21
1.4368	Ne I	He-Ne		CW	21
1.4539	C I	CO or CO_2 in He or Ne	$3p\,{}^1P_1 \rightarrow 3s\,{}^1P^o_1$	CW	37
1.4544	N I	NO or NO_2 with He or Ne	$4s\,{}^4P_{5/2} \rightarrow 3p\,{}^2D^o_{5/2}$	CW	37
1.5235	Ne	He-Ne or He-Ne-Xe Mixture	$2s_2 \rightarrow 2p_1$	CW	9, 16, and 76
1.5288	Hg I	Hg-He	$6p'\,{}^3P_2 \rightarrow 7\,{}^3S_2$ or $18p\,{}^3P^o_1 \rightarrow 7d\,{}^1D_2$ or $15f\,{}^3F^o_3 \rightarrow 7d\,{}^1D_2$		30, 77
1.5550	Hg II	Hg-He	$7p_{3/2} \rightarrow 6d_{5/2}$	Pulsed	30

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
1.6114	Ne I	He-Ne	$2s_3 \rightarrow 2p_5$	CW	34
1.6180	A I	Pure Argon	$5s[3/2]^o \rightarrow 4p'[3/2]_2$	CW	20, 21
1.690	Kr I	Krypton	$4d[1/2]^o_1 \rightarrow 5p[1/2]_1$	CW	16
1.690	Ne I	Neon			4
1.6916	Hg I	Hg-He	$5'F_3 \rightarrow 6'D_2$	Pulsed	30
1.6936	Kr I	Krypton	$4d[5/2]^o_2 \rightarrow 5p[3/2]_1$	CW	21
1.6939	Hg I	Hg + He	$5\,^3F_2 \rightarrow 6\,^3D_1$	Pulsed	30
1.694	Ne	Neon		CW	4
1.6941	A I	Argon	$3d[3/2]^o \rightarrow 4p[3/2]_2$	CW	20, 21
1.7070	Hg I	Hg-He	$7'D_2 \rightarrow 7\,^3P_2$	Pulsed	30
1.7112	Hg I	Hg + He	$5\,^3F_3 \rightarrow 6\,^3D_2$	Pulsed	30
1.731	Xe	Pure Xenon	$6p[5/2]_2 \rightarrow 5d[3/2]^o_1$	CW	87
1.74	Hg I	Hg with He, Ne or Kr	$6p'\,^3F_4 \rightarrow 7p\,^3P_2$	Pulsed	17
1.784	Ne	Neon		CW	4
1.7843	Kr	Krypton	$4d[1/2]^o_o \quad 5p[1/2]_1$	CW	20, 21
1.793	A I	Argon	$3d[1/2]^o_1 \rightarrow 4p[3/2]_2$	CW	20

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
1.81	Hg I	Hg	$8s'S_o \rightarrow 6p'^3P_2$	Pulsed	17
1.8128	Hg I	Hg + He	$6p'^3F_4 \rightarrow 6^3D_3$	Pulsed	30, 77
1.8185	Kr I	Krypton	$4d'[5/2]^o_2 \rightarrow 5p'[3/2]_2$	CW	20, 21
1.8276	Ne I	He-Ne	$4V \rightarrow 3d'_4$	CW	90
1.8281	Ne I	He-Ne	$4f[9/2]_4 \rightarrow 3d[7/2]^o_4$	CW	16, 90
1.8287	Ne I	Ne-He	$4f[9/2]_4 \rightarrow 3d[7/2]^o_3$	CW	16, 90
1.8309	Ne I	He-Ne	$4f[5/2]_2 \rightarrow 3d[3/2]^o_2$	CW	16, 90
1.8408	Ne I	He-Ne	$4f[5/2]_2 \rightarrow 3d[3/2]^o_1$	CW	16, 90
1.8596	Ne I	He-Ne	$4f[7/2]_3 \rightarrow 3d[5/2]^o_3$	CW	16, 90
1.8602	Ne I	He-Ne	$4f[5/2]_3 \rightarrow 3d[5/2]^o_3$	CW	16, 90
1.9211	Kr I	Krypton	$8s[3/2]^o_1 \rightarrow 6p[5/2]_2$	CW	16, 21
1.9579	Ne I	He-Ne	$3p_4 \rightarrow 2S_5$	CW	34
1.975528	Cl I	Cl_2 and Cl_2-He mixture	$3d^4D_{7/2} \rightarrow 4p^4P_{5/2}$	CW	31, 55
2.019936	Cl I	Cl_2 and Cl_2-He mixture	$3d^4D_{5/2} \rightarrow 4p^4P_{3/2}$	CW	31

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
2.0261	Xe	Pure Xenon, Xe-He Mixture or Xe-He-Ne Mixture	$5d[3/2]^o_1 \rightarrow 6p[3/2]_1$		10, 20, and 87
2.03514	Ne I	He-Ne	$3p_4 \rightarrow 2s_4$		7, 34, and 36
2.038	Ne I	He-Ne		CW	36
2.0603	He	Helium	$7^3D \rightarrow 4^3P$	CW	16
2.0616	A I	Argon	$3d[3/2]^o_2 \rightarrow 4p'[3/2]_2$	CW	16
2.0665	C I	CO_2-He	$4p'P_2 \rightarrow 4p'P_1$	CW	93
2.0985	A I	Argon	$2p_5 \rightarrow 3d_5$	CW	23
2.1019	Ne I	Neon	$4d'[5/2]^o_2 \rightarrow 4p[3/2]_2$	CW	16, 20
2.10411	Ne I	Neon	$3p_1 \rightarrow 2s_2$	CW	7
2.1165	Kr I	Krypton	$4d[3/2]^o_2 \rightarrow 5p[3/2]_1$	CW	20, 21
2.1339	A I	Argon	$3d[1/2]^o_1 \rightarrow 4p'[3/2]_1$	CW	16
2.1533	A I	Argon	$2p_2 \rightarrow 3d_3$	CW	23
2.189	Kr I	Krypton	$4d[3/2]^o_2 \rightarrow 5p[3/2]_2$	CW	20, 21, and 80
2.20245	A I	Argon	$3d[1/2]^o_o \quad 4p'[3/2]_1$	CW	36

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
2.3139	A I	Argon	$3d[1/2]^o_1 \rightarrow 4p'[1/2]_1$	CW	36
2.31996	Xe	Xenon	$5d[2\ 1/2]^o_3 \rightarrow 6p[2\ 1/2]_2$	CW	10, 21, and 89
2.3952	Ne	He-Ne	$3p_4 \rightarrow 2s_2$	CW	23, 24
2.3973	A I	Argon	$3d[1/2]^o_o \rightarrow 4p'[1/2]_1$	CW	36
2.4223	Ne I	Neon	$4d[3/2]_1 \rightarrow 4p[5/2]_2$	CW	19
2.4358	Kr I	Krypton	$2p_7 \rightarrow 3d_5$		23
2.485	Xe I	Pure Xenon	$6p[5/2]_3 \rightarrow 5d[5/2]^o_3$	CW	87
2.5014	A I	Pure Argon	$6d'[3/2]^o_2 \rightarrow 6p[1/2]_1$	CW	36
2.5241	Kr I	Pure Krypton	$4d[1/2]^o_1 \rightarrow 5p[3/2]_2$	CW	16, 21, and 79
2.5400	Ne I	Pure Neon	$4d[1/2]^o_1 \rightarrow 4p[3/2]_2$		36
2.5494	A I	Pure Argon	$5p[5/2]_3 \rightarrow 3d[7/2]^o_3$	CW	36
2.5512	Ar I	Pure Argon	$5p[1/2]_o \rightarrow 5s[3/2]^o_1$	CW	36
2.5634	A I	Pure Argon	$6d'[3/2]^o_2 \rightarrow 6p[5/2]_3$	CW	16
2.5668	A I	Pure Argon	$5p'[1/2]_o \rightarrow 5s'[1/2]^o_1$	CW	36
2.60	Xe I	Xe-He Ne-He-Xe		CW	76

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
2.604	He I	Pure He			88
2.6267	Kr I	Pure Krypton	$4d[1/2]^o_0 \rightarrow 5p[3/2]_1$	CW	36
2.6269	Xe I	He-Xe		CW	21
2.6276	Xe I	Pure Xenon	$5d[5/2]^o_2 \rightarrow 6p[5/2]_2$	CW	10
2.6288	Kr I	Pure Krypton	$7p[3/2]_2 \rightarrow 4d'[5/2]^o_2$	CW	36
2.6518	Xe I	He-Xe	$5d[3/2]^o_1 \rightarrow 6p[1/2]_0$	CW	10, 18, 21, 87, and 89
2.660	Xe I	Pure Xenon	$5d'[3/2]^o_1 \rightarrow 6p'[1/2]_0$	CW	16
2.6843	A I	Pure Argon	$5p[3/2]_1 \rightarrow 3d[5/2]^o_2$	CW	36
2.7364	A I	Pure Argon	$5p'[1/2]_1 \rightarrow 3d'[3/2]^o_2$	CW	36
2.7581	Ne I	Pure Neon	$4d[3/2]^o_1 \rightarrow 4p[1/2]_0$	CW	36
2.7826	Ne I	Pure Neon	$5s'[1/2]^o_0 \rightarrow 4p[3/2]_1$	CW	36
2.8202	A I	Pure Argon	$5p'[3/2]_1 \rightarrow 5s'[1/2]^o_0$	CW	36
2.8245	A I	Pure Argon	$5p[3/2]_2 \rightarrow 5s[3/2]^o_1$	CW	36
2.8618	Kr I	Pure Krypton	$6p[5/2]_2 \rightarrow 6s[3/2]^o_2$	CW	36
2.864	Ne I	Pure Neon	$4d'[3/2]^o_1 \rightarrow 4p'[3/2]_2$		16

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
2.8663	Kr I	Pure Krypton	$6p[5/2]_3 \rightarrow 6s[3/2]^o_2$	CW	36
2.8783	A I	Pure Argon	$5p[5/2]_3 \rightarrow 5s[3/2]^o_2$	CW	36
2.8843	A I	Pure Argon	$5p[3/2]_2 \rightarrow 3d[5/2]^o_3$	CW	36
2.9280	A I	Pure Argon	$5p[1/2]_o \rightarrow 3d[3/2]^o_1$	CW	36
2.9456	Ne I	Pure Neon	$5s[3/2]^o_1 \rightarrow 4p[1/2]_1$	CW	36
2.9676	Ne I	Pure Neon	$4d[3/2]^o_1 \rightarrow 4p'[3/2]_1$	CW	36
2.9796	A I	Pure Argon	$5p[5/2]_2 \rightarrow 5s[3/2]^o_1$	CW	36
2.9813	Ne I	Pure Neon	$4d[3/2]^o_2 \rightarrow 4p'[3/2]_1$	CW	36
2.9845	Kr I	Pure Krypton	$6p'[1/2]_1 \rightarrow 5d[5/2]^o_2$	CW	36
2.9878	Kr I	Pure Krypton	$6p'[3/2]_1 \rightarrow 6s'[1/2]^o_o$	CW	36
3.0268	Ne I	Pure Neon	$4d[3/2]^o_2 \rightarrow 4p'[1/2]_1$	CW	36
3.0276	Ne I	Pure Neon	$4d[3/2]^o_2 \rightarrow 4p'[3/2]_2$	CW	36
3.0462	A I	Pure Argon	$5p[5/2]_2 \rightarrow 3d[5/2]^o_3$	CW	30
3.0536	Kr I	Pure Krypton	$6p'[3/2]_1 \rightarrow 5d[5/2]^o_2$	CW	36
3.0672	Kr I	Pure Krypton	$6p[1/2]_1 \rightarrow 6s[3/2]^o_2$	CW	36

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
3.0996	A I	Pure Argon	$5p[5/2]_3 \rightarrow 3d[5/2]^{\circ}_3$	CW	36
3.1078	Xe I	Pure Xenon He-Ne-Xe or He-Xe mixtures	$5d[2\ 1/2]^{\circ}_3 \rightarrow 6p[1\ 1/2]_2$	CW	10, 18, 21, and 76.
3.1333	A I	Pure Argon	$5p[1/2]_1 \rightarrow 5s[3/2]^{\circ}_2$	CW	36
3.1346	A I	Pure Argon	$6p'[3/2]_2 \rightarrow 4d[5/2]^{\circ}_2$	CW	16
3.1515	Kr I	Pure Krypton	$6p'[1/2]_0 \rightarrow 5d[3/2]^{\circ}_1$	CW	36
3.204	Cs	Cs	$8P_{1/2} \rightarrow 6D_{3/2}$	Optically pumped, CW	4, 88, 91, and 92
3.2083	A I	Pure Argon	$3d[1/2]^{\circ}_1 \rightarrow 4p'[3/2]_2$	CW	36
3.236	Hg I	Pure Hg			88
3.236	I	I_2	$(3p_2)5d[2]_{5/2} \rightarrow (3p_2)6P[1]_{3/2}$	CW	31, 77
3.2742	Xe I	Pure Xenon	$2p_{10} \rightarrow 3d_3$	CW	23, 80
3.3182	Ne I	Pure Ne I	$5s[3/2]^{\circ}_1 \rightarrow 4p[5/2]_2$	CW	36
3.3362	Ne I	Pure Neon	$5s[3/2]^{\circ}_2 \rightarrow 4p[5/2]_3$ or $5s'[1/2]^{\circ}_1 \rightarrow 4p[3/2]_1$	CW	36

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
3.34	Hg I	Hg and He, Hg-Ne-Xe Hg-air	$6p'^3F_4 \rightarrow 8s^3S_1$	Pulsed	17
3.3409	Kr I	Krypton	$6p[1/2]_1 \rightarrow 6s[3/2]^\circ_1$	CW	36
3.3419	Kr I	Pure Krypton	$4d[1/2]^\circ_1 \rightarrow 5p[1/2]_0$	CW	79
3.36757	Xe I	Pure Xenon, He-Xe or He-Ne-Xe mixture	$5d[5/2]^\circ_2 \rightarrow 6p[3/2]_1$	CW	10, 21, 76, 80, and 89
3.3813	Ne I	Pure Neon	$7s'(1/2)^\circ_0 \rightarrow 5p'(3/2)_1$ or $7s'(1/2)^\circ_0 \rightarrow 5p'(1/2)_1$	CW	36
3.3912	Ne I	Pure Neon	$5s'[1/2]^\circ_1 \rightarrow 4p'[1/2]_1$	CW	36, 34
3.3922	Ne I	Neon	$5s'[1/2]^\circ_1 \rightarrow 4p'[3/2]_2$	CW	36
3.4046	C I	CO_2-He	$4d'D_2 \rightarrow 4p'P_1$	CW	93
3.431	I I	I_2	$(3p_2)5d[4]_{7/2} \rightarrow (3P_2)6p[3]_{5/2}$	Pulsed	31, 77
3.4345	Xe I	Pure Xenon	$7p[5/2]_2 \rightarrow 7s[3/2]^\circ_1$	CW	36
3.437	Hg I	Pure Hg			88

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
3.440	Xe I	Pure Xenon	$9d[3/2]^o$ $8p[3/2]$	CW	16
3.4481	Ne I	Pure Neon	$5s[3/2]^o$ $4p[3/2]$	CW	36
3.4680	Kr I	Pure Krypton	$7s[3/2]^o$ $6p[1/2]$	CW	36
3.4883	Kr I	Krypton	$6p'[1/2]_1 \rightarrow 7s[3/2]^o_2$ or $6p'[1/2]_1 \rightarrow 5d[3/2]^o_1$	CW	36
3.50800	Xe I	Pure Xenon, Xe-He He-Ne-Xe	$5d[7/2]^o_3 \rightarrow 6p[0\ 5/2]_2$	CW	10, 76, and 89
3.5155	C I	CO_2-He	$6d\,^3P_2 \rightarrow 4p\,^3P_3$	CW	93
3.5845	Xe I	Pure Neon	$5s[3/2]^o_2 \rightarrow 4p[3/2]_2$	CW	36
3.6518	Xe I	Pure Xenon	$7p[1/2]_1 \rightarrow 7s[3/2]^o_2$	CW	36
3.67984	Xe I	Xe and He-Xe	$5d[0\ 1/2]^o_1 \rightarrow 6p[0\ 1/2]_1$	CW	10, 21, and 89
3.68586	Xe I	Pure Xenon and He-Xe	$5d[5/2]^o_2 \rightarrow 6p[3/2]_2$	CW	10, 16, 21, and 89
3.7746	Ne I	Pure Neon	$4p'[1/2]_o \rightarrow 3d[3/2]^o_1$	CW	36

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
3.86968	Xe I	Pure Xenon	$5d'[5/2]^o_3 \rightarrow 6p'[3/2]_2$	CW	16, 89
3.89504	Xe	Pure Xenon He-Xe	$5d[7/2]^o_3 \rightarrow 6p[5/2]_3$		10, 21, and 89
3.93	Hg I	Hg-Kr Mixture	$6p'\,^3F_4 \rightarrow 8s'S_o$	Pulsed	17
3.9817	Ne I	Pure Neon	$5s[3/2]^o \rightarrow 4p[1/2]_o$	CW	36, 16
3.99656	Xe I	Pure Xenon, He-Xe	$5d[1/2]^o_o \rightarrow 6p[1/2]_1$	CW	10, 16, 21, and 89
4.160	Xe I	Pure Xenon	$5d'[5/2]^o_2 \rightarrow 7p[3/2]_1$	CW	16
4.3748	Kr I	Pure Krypton	$5d[3/2]^o_1 \rightarrow 4p[3/2]_2$	CW	36
4.602	Xe I	Xenon	$5d'[3/2]^o_2 \rightarrow 6p'[1/2]_1$	CW	16
4.61094	Xe I	Pure Xenon	$3s''''_1 \rightarrow 2p_2$	CW	89
4.7330	A I	Pure Argon	$5p[1/2]_1 \rightarrow 3d'[3/2]^o_1$	CW	16
4.8773	Kr I	Pure Krypton	$4d[3/2]^o_1 \rightarrow 5p'[3/2]_1$	CW	36
4.8832	Kr I	Pure Krypton	$5d[5/2]^o_2 \rightarrow 6p[5/2]_3$	CW	36
4.9160	A I	Pure Argon	$6p'[3/2]_2 \rightarrow 4d'[3/2]^o_2$	CW	36

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
4.9213	A I	Pure Argon	$5d[5/2]^o_2 \rightarrow 4[7/2]_3$	CW	36
5.1216	A I	Pure Argon	$6p[5/2]_3 \rightarrow 4d[7/2]^o_3$	CW	36
			or		
			$5d[7/2]^o_3 \rightarrow 4f[9/2]_4$		
5.3000	Kr I	Pure Krypton	$5d[3/2]^o_1 \rightarrow 6p[1/2]_o$	CW	36
			or		
			$5d[3/2]^o_1 \rightarrow 6p[5/2]_2$		
5.4048	Ne I	Pure Neon	$4p'[1/2]_o \rightarrow 3d'[3/2]^o_1$	CW	36
5.4680	A I	Pure Argon	$5d[7/2]^o_4 \rightarrow 4f[9/2]_5$	CW	36
			or		
			$5d[7/2]^o_4 \rightarrow 4f[9/2]_4$		
5.5700	Kr I	Pure Krypton	$5d[7/2]^o_3 \rightarrow 6p[5/2]_2$	CW	36
5.57539	Xe I	Pure Xenon	$5d[7/2]^o_4 \rightarrow 6p[5/2]_3$	CW	10, 16, and 89
5.5863	Kr I	Pure Krypton	$6d[7/2]^o_4 \rightarrow 4f[9/2]_5$	CW	36
5.5987	C I	CO_2-He	$4p\,^3S_1 \rightarrow 3d\,^3P_1$	CW	93

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
5.6306	Kr I	Pure Krypton	$6d[3/2]_2 \rightarrow 4f[5/2]_3$	CW	19, 36
5.667	Ne I	Pure Neon	$4p[1/2]_0 \rightarrow 3d[3/2]^o_1$	CW	19, 36
5.847	Ar I	Pure Argon	$6p[1/2]_0 \rightarrow 6s[3/2]^o_1$	CW	36
5.85	Hg I	Hg-Kr	$6p' \, {}^1P_1 \rightarrow 7d\text{-}{}^3D_2$	Pulsed	17
6.0531	A I	Pure Argon	$4d[1/2]^o_1 \rightarrow 5p[5/2]_2$	CW	36
6.9448	A I	Pure Argon	$6p'[1/2]_1 \rightarrow 6s'[1/2]^o_1$ or $4d[3/2]^o_1 \rightarrow 5p'[3/2]_1$	CW	36
7.0581	Kr I	Pure Krypton	$4f[7/2]_3 \rightarrow 5d[7/2]^o_4$	CW	36
7.1821	Cs	Cesium	$8P_{1/2} \rightarrow 8s_{1/2}$	Optically pumped	21, 33, 91, 12, and 59
7.2116	A I	Pure Argon	$6p[1/2]_1 \rightarrow 6s[3/2]^o_2$	CW	36
7.31667	Xe I	Pure Xenon and He-Xe	$5d[3/2]^o_2 \rightarrow 6p[3/2]_1$	CW	10, 21, and 89
7.3228	Ne I	Pure Neon	$6s[3/2]^o_2 \rightarrow 5p[5/2]_3$	CW	36
7.4221	Ne	Neon	$5p[1/2]_1 \rightarrow 4d[3/2]^o$ or $6s'[1/2]_1 \rightarrow 5p[1/2]_1$	CW	36

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
7.4799	Ne I	Pure Neon	$4p[3/2]_2 \rightarrow 3d[5/2]^o_3$	CW	36
7.4994	Ne I	Pure Neon	$6s[3/2]^o_2 \rightarrow 5p[5/2]_2$	CW	36
7.5316	Ne I	Pure Neon	$6s[3/2]_1 \rightarrow 5p[3/2]_1$	CW	19
7.6163	Ne I	Pure Neon	$4p[3/2]_1 \rightarrow 3d[5/2]^o_2$	CW	36
7.6461	Ne I	Pure Neon	$5p[3/2]_1 \rightarrow 4d[5/2]^o_2$	CW	16
7.6510	Ne I	Pure Neon	$4p[5/2]_2 \rightarrow 3d[7/2]^o_3$	CW	36
7.6925	Ne I	Pure Neon	$4p'[3/2]_2 \rightarrow 3d'[5/2]^o_2$	CW	16
7.7015	Ne I	Pure Neon	$4p[3/2]_2 \rightarrow 3d'[5/2]^o_3$	CW	36
7.7407	Ne I	Pure Neon	$4p[5/2]_2 \rightarrow 3d[3/2]^o_2$	CW	36
7.7655	Ne I	Pure Neon	$4p'[1/2]_1 \rightarrow 3d'[3/2]^o_2$	CW	36
7.7815	Ne I	Pure Neon	$6s[3/2]^o_2 \rightarrow 5p[3/2]_1$	CW	36
7.8013	A I	Pure Argon	$4f[3/2]_2 \rightarrow 4d[3/2]_2$ or $4f[3/2]_1 \rightarrow 4d[3/2]_2$	CW	36
7.8063	A I	Argon	$7s'[1/2]^o_1 \rightarrow 6p[1/2]_1$	CW	16
7.8368	Ne I	Pure Neon	$6s[3/2]^o_2 \rightarrow 5p[3/2]_2$	CW	36

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
8.0088	Ne I	Pure Neon	$4p'[3/2]_1 \rightarrow 3d[5/2]^\circ_2$	CW	36
8.0621	Ne I	Pure Neon	$4p[5/2]_3 \rightarrow 3d[7/2]^\circ_4$	CW	36
8.3370	Ne I	Pure Neon	$4p[5/2]_2 \rightarrow 3d[5/2]^\circ_2$ or $4p[5/2]_2 \rightarrow 3d[5/2]^\circ_3$	CW	36
8.683		N_2			88
8.8553	Ne I	Pure Neon	$4p[5/2]_3 \rightarrow 3d[5/2]^\circ_3$ or $4p[5/2]_3 \rightarrow 3d[5/2]^\circ_2$	CW	36
9.00649	Xe I	Pure Xenon	$5d[3/2]^\circ_2 \rightarrow 6p[3/2]_2$	CW	10, 16, and 89
9.0896	Ne I	Pure Neon	$6s[3/2]^\circ \rightarrow 5p[1/2]_0$	CW	36
9.4	CO_2	CO_2		Pulsed and CW	79
9.7002	Xe	He-Xe			21
9.7029	Xe I	Pure Xenon	$5d[1/2]^\circ_1 \rightarrow 6p[3/2]_1$	CW	10

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
10.063	Ne I	Pure Neon	$4p[1/2]_1 \rightarrow 3d[3/2]^{\circ}$	CW	36
10.234	He I	Pure Helium			88
10.4	CO_2	CO_2		Pulsed and CW	79
10.9812	Ne I	Pure Neon	$4p[1/2]_1 \rightarrow 3d[3/2]^{\circ}_2$	CW	19
11.299	Xe I	Pure Xenon	$5d'[5/2]^{\circ}_3 \rightarrow 4f[9/2]_4$	CW	36
11.861	Ne I	Pure Neon	$5p[1/2]_1 \rightarrow 5s'[1/2]^{\circ}_o$	CW	36
11.902	Ne I	Pure Neon	$5p[1/2]_o \rightarrow 4d[3/2]^{\circ}_1$	CW	16
12.143	A I	Argon	$4d'[3/2]^{\circ}_1 \rightarrow 4f[3/2]_1$	CW	36
			or		
			$4d'[3/2]^{\circ}_1 \rightarrow 4f[3/2]_2$		
12.266	Xe I	Pure Xenon	$5d[1/2]^{\circ}_o \rightarrow 6p[3/2]_1$	CW	10
12.835	Ne I	Pure Neon	$5p'[1/2]_o \quad 4d[3/2]^{\circ}_1$	CW	36
12.917	Xe I	Xe and He-Xe	$5d[1/2]^{\circ}_1 \rightarrow 6p[3/2]_2$	CW	10, 21
13.759	Ne	Neon	$7s[1/2]^{\circ}_1 \rightarrow 6p'[3/2]_2$	CW	16, 36
			or		
			$4d'[5/2]^{\circ}_2 \rightarrow 4f[5/2]_2$		

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
15.037	A I	Pure Argon	$5d'[3/2]_2 \rightarrow 5f[5/2]_2$	CW	36
			or		
			$5d'[3/2]_2 \rightarrow 5f[5/2]_2$		
16.638	Ne I	Pure Neon	$5p[3/2]_2 \rightarrow 4d[5/2]^o_2$	CW	36
16.668	Ne I	Pure Neon	$5p[3/2]_2 \rightarrow 4d[5/2]^o_3$	CW	36
16.893	Ne I	Pure Neon	$5p[3/2]_1 \rightarrow 4d[5/2]^o_2$	CW	36
16.947	Ne I	Pure Neon	$5p[5/2]_2 \rightarrow 4d[7/2]^o_3$	CW	36
17.158	Ne I	Pure Neon	$5p'[3/2]_2 \rightarrow 4d[5/2]^o_3$	CW	36
17.189	Ne I	Pure Neon	$5p'[3/2]_2 \rightarrow 4d'[3/2]^o_2$	CW	36
17.804	Ne I	Pure Neon	$5p[1/2] \rightarrow 4d[3/2]^o_2$	CW	36
17.841	Ne I	Pure Neon	$5p'[3/2]_1 \rightarrow 4d'[5/2]^o_2$	CW	36
17.888	Ne I	Pure Neon	$5p[5/2]_3 \rightarrow 4d[7/2]^o_4$	CW	36
18.396	Ne I	Pure Neon	$5p[5/2]_2 \rightarrow 4d[5/2]^o_2$	CW	36
18.506	Xe I	Pure Xenon	$5d'[3/2]^o_2 \rightarrow 4f[5/2]_3$	CW	36
20.480	Ne I	Pure Neon	$6p[1/2]_o \rightarrow 5d[1/2]^o_1$	CW	36
21.752	Ne I	Pure Neon	$6p[1/2] \rightarrow 5d[3/2]^o_1$	CW	36

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
22.836	Ne I	Pure Neon	$5p[1/2]_1 \rightarrow 4d[3/2]^o_2$	CW	36
23.3	OH	H_2O		Pulsed	98
25.423	He I	Pure Neon	$6p'[1/2]_o \rightarrow 5d[3/2]^o_1$	CW	36
26.944	A I	Pure Argon	$4d'[3/2]^o_2 \rightarrow 4f[5/2]_3$	CW	36
28.0	OH	H_2O		Pulsed	96
28.053	Ne I	Pure Neon	$6p[3/2]_1 \rightarrow 5d[1/2]^o_o$	CW	36
31.533	Ne I	Pure Neon	$6p[3/2]_2 \rightarrow 5d[5/2]^o_3$	CW	36
31.928	Ne I	Pure Neon	$6p[3/2]_1 \rightarrow 5d[5/2]^2_o$	CW	8
32.016	Ne I	Pure Neon	$6p[5/2]_2 \rightarrow 5d[7/2]^o_3$	CW	36
32.516	Ne I	Pure Neon	$6p'[3/2]_2 \rightarrow 5d'[5/2]^o_3$	CW	36
32.8	OH	H_2O		Pulsed	98
33.824	Ne I	Pure Neon	$6p'[3/2]_1 \rightarrow 5d'[5/2]^o_2$ or $6p[5/2]_3 \rightarrow 6p[5/2]_3 - 5d[7/2]^o_4$	CW	36
34.552	Ne I	Pure Neon	$6p'[1/2]_1 \rightarrow 5d'[3/2]^o_2$	CW	36
34.679	Ne I	Pure Neon	$6p[5/2]_2 \rightarrow 5d[5/2]^o_2$	CW	8

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
35.602	Ne I	He-Ne	$7p[1/2]_o \rightarrow 6d[3/2]^o_1$	CW	8
36.3		D_2O		Pulsed	96
37.231	Ne I	Neon	$7p'[1/2]_o \rightarrow 6d'[3/2]^o_1$	CW	8
41.741	Ne I	Pure Neon	$6p[1/2]_1 \rightarrow 5d[3/2]^o_2$	CW	8
47.4	OH	H_2O		Pulsed	96
50.70	Ne I	Pure Neon	$7p[3/2]_2 \rightarrow 6d[3/2]^o_2$	CW	32
52.39	Ne I	Pure Neon	$7p'[1/2]_1 \rightarrow 6d'[3/2]^o_2$	CW	32
53.486	Ne I	Pure Neon	$7p[3/2]_2 \rightarrow 6d[5/2]^o_3$	CW	8
54.019	Ne I	He-Ne	$7p[3/2]_1 \rightarrow 6d[5/2]^o_2$	CW	8
54.117	Ne I	He-Ne	$4p[5/2]_2 \rightarrow 6d[7/2]^o_3$	CW	8
54.7	OH	H_2O		CW, Pulsed	96, 97
55.68	Ne I	Pure Neon	$7p'[3/2]_1 \rightarrow 6d'[5/2]^o_2$	CW	32
57.355	Ne I	He-Ne	$7p[5/2]_3 \rightarrow 6d[7/2]^o_4$	CW	8
68.329	Xe I	Pure Xenon		CW	58
72.15	Ne I	Pure Neon	$8p'[1/2]_o \rightarrow 7d'[3/2]^o_1$	CW	32
72.7		D_2O		Pulsed	96
78.4	OH	H_2O	Rotational, K=4, to K=3 in V'=1 state	Pulsed and CW	96, 97

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
85.047	Xe I	Pure Xenon		CW	58
86.9	Ne I	Pure Neon	8p'[3/2] 7d'[5/2]°	CW	32
88.46	Ne I	Pure Neon	8p[3/2] 7d[5/2]°	CW	32
89.93	Ne I	Pure Neon	8p[5/2] 7d[7/2]°	CW	32
93.02	Ne I	Pure Neon			32
106.02	Ne I	Pure Xenon	$10p[1/2]_o$ 9d[3/0]°	CW	32
118.8	OH	H_2O	Rotational K=3 to K = 2 in V' = 3 state	Pulsed and CW	96, 97
124.4	Ne I	Pure Neon	9p[3/2] 8d[5/2]°	CW	32
126.1	Ne I	Pure Neon		CW	94
132.8	Ne I	Pure Neon		CW	32
337.		HCN, CH_3CN or C_2H_5CN as starting material.		Pulsed	95

Supplemental List

Wave Length	Element	Gas Mixture	Transition	Remarks	Reference
.347876	N IV	N_2, air	$3p\,^3P^0_2 \rightarrow 3s\,^3S_1$	Pulsed	99
.409729	N III	N_2, air	$3p^2P^0_{3/2} \rightarrow 3s^2S_{1/2}$	Pulsed	99
.410326	N III	N_2, air	$3p^2P^0_{1/2} \rightarrow 3s^2S_{1/2}$	Pulsed	99
.451045	N III	N_2, air	$3p^4D_{5/2} \rightarrow 3s^4P^0_{3/2}$	Pulsed	99
.451441	N III	N_2, air	$3p^4D_{7/2} \rightarrow 3s^4P^0_{5/2}$	Pulsed	99
.463031	N II	N_2, air	$3p^3P_2 \rightarrow 3s^3P^0_2$	Pulsed	99
.672138	O II	O_2	$3p^2S^0_{1/2} \rightarrow 3s^2P_1$	Pulsed	99
5.03755	CO	CO	V" = 6, V' = 5, P(7)	"	100
5.04750	"	"	" P(8)	"	"
5.05755	"	"	" P(9)	"	"
5.06773	"	"	" P(10)	"	"
5.07807	"	"	" P(11)	"	"
5.08845	"	"	" P(12)	"	"
5.09905	"	"	" P(13)	"	"
5.10410	"	"	V" = 7, V' = 6, P(7)	"	"

Wave Length	Element	Gas Mixture	Transition		Remarks	Reference
5.10985	CO	CO	V" = 6, V' = 5,	P(14)	Pulsed	100
5.11418	"	"	V" = 7, V' = 6	P(8)	"	"
5.12445	"	"	"	P(9)	"	"
5.13485	"	"	"	P(10)	"	"
5.14530	"	"	"	P(11)	"	"
5.15595	"	"	"	P(12)	"	"
5.16666	"	"	"	P(13)	"	"
5.17220	"	"	V" = 8, V' = 7,	P(7)	"	"
5.17765	"	"	V" = 7, V' = 6,	P(14)	"	"
5.18250	"	"	V" = 8, V' = 7,	P(8)	"	"
5.18865	"	"	V" = 7, V' = 6,	P(15)	"	"
5.19290	"	"	V" = 8, V' = 7,	P(9)	"	"
5.20345	"	"	"	P(10)	"	"
5.21410	"	"	"	P(11)	"	"
5.22498	"	"	"	P(12)	"	"

Wave Length	Element	Gas Mixture	Transition		Remarks	Reference
5.23600	CO	CO	V" = 8, V' = 7,	P(13)	Pulsed	100
5.24195	"	"	V" = 9, V' = 8,	P(7)	"	"
5.24710	"	"	V" = 8, V' = 7,	P(14)	"	"
5.25250	"	"	V" = 9, V' = 8,	P(8)	"	"
5.26310	"	"	"	P(9)	"	"
5.27380	"	"	"	P(10)	"	"
5.28465	"	"	"	P(11)	"	"
5.29570	"	"	"	P(12)	"	"
5.30695	"	"	"	P(13)	"	"
5.31820	"	"	"	P(14)	"	"
5.32415	"	"	V" = 10, V' = 9	P(8)	"	"
5.44590	"	"	"	P(9)	"	"
5.34590	"	"	"	P(10)	"	"
5.35695	"	"	"	P(11)	"	"
5.36820	"	"	"	P(12)	"	"
5.37950	"	"	"	P(13)	"	"

Solid Lasers

Wave Length	Element	Host	Transition	Remarks	Reference
.3125	Gd^{+3}	LiMg AISi Glass	$^6p_{7/2} \rightarrow {}^8s_{7/2}$	77°K, Pulsed	21, 15, and 67
.6130	Eu^{+3}	Plastic		77°K, Pulsed	1
.6130	Eu^{+3}	Benzoylacetonate, Chelate	Europium Dibenzoylmethide (EuD_3)	100°K, Pulsed	21, 101, and 102
.6130	Eu^{+3}	TTA Chelate		77°K, Pulsed	21
.6164	Ni^{+2}	MgF_2	$3T_2 \rightarrow$ phonon level	77°K	25
.6919	Cr^{+3}	Al_2O_3		77°K	15
.6929	Cr^{+3}	Al_2O_3	$2E(2\bar{A}) \rightarrow 4A_2$	290°K	15
.6934	Cr^{+3}	Al_2O_3	$2D(2\bar{E}) \rightarrow 4A_2$	77°K, CW	15
.6943	Cr^{+3}	Al_2O_3	$2E \rightarrow 4A_2$	300°K	12
.6969	Sm^{+2}	SrF_2		Pulsed	4
.7	Sm^{+2}	CaF_2, SrF_2		77°K	13
.7010	Cr^{+3}	Al_2O_3			13, 43
.704	Cr^{+3}	Al_2O_3		77°K, Pulsed	21
.7082	Sm^{+2}	CaF_2	$(4f)^5 5d \rightarrow F_1(4f)^6$	77°K, 20°K	1, 12

Wave Length	Element	Host	Transition	Remarks	Reference
.7670	Cr^{+3}	Al_2O_3			41
.9180	Nd^{+3}	SiNaCaAlSb, Borate Glass	$^4F_{3/2} \rightarrow {}^4I_{9/2}$	77°K, Pulsed	21, 52, and 57
1.0	Pr^{+3}	$SrMoO_4$		20°K, Pulsed	21
1.015	Yb^{+3}	Glass	$^2F_{5/2} \rightarrow {}^2F_{7/2}$	77°K	13, 15
1.02	Yb^{+3}	LiMgAlSi	$^2F_{5/2} \rightarrow {}^2F_{7/2}$	77°K	21
1.02	Yb^{+3}	Glass	$^2F_{5/2} \rightarrow {}^2F_{7/2}$	77°K	1
1.0370	Nd^{+3}	SrF_2	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	295°K	24
1.0399	Nd^{+3}	LaF_3	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	77-300°K	21, 24
1.0437	Nd^{+3}	SrF_2	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.0457	Nd^{+3}	CaF_2	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.0468	Pr^{+}	$CaWO_4$	$^1G_4 \rightarrow {}^3H_4$	77°K	22
1.047	Pr^{+}	$SrMoO_4$	$^1G_4 \rightarrow {}^3H_4$	77°K	22
1.047	Pr^{+}	$CaWO_4$	$^1G_4 \rightarrow {}^3H_4$	77°K	1, 15
1.0547	Nd^{+}	SrWO	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.057	Nd^{+}	Borate Glass	$^4F_{3/2} \rightarrow {}^4I_{11/2}$		52

Wave Length	Element	Host	Transition	Remarks	Reference
1.0579	Nd^{+3}	$SrMoO_4$	$4F_{3/2} \rightarrow 4I_{11/2}$	295°K	24
1.0576	Nd^{+3}	$CaWO_4$	$4F_{3/2} \rightarrow 4I_{11/2}$	77°K, CW	24
1.0582	Nd^{+3}	$CaWO_4$	$4F_{3/2} \rightarrow 4I_{11/2}$	77°K, CW	24
1.0586	Nd^{+3}	PbMoO	$4F_{3/2} \rightarrow 4I_{11/2}$	295°K	24
1.059	Nd^{+3}	$SrMoO_4$	$4F_{3/2} \rightarrow 4I_{11/2}$	77°K	24
1.06	Nd^{+3}	CaF_2		90°K, Pulsed	38
1.06	Nd^{+3}	American Optical barium crown glass	$4F_{3/2} \rightarrow 4I_{11/2}$	300°K, CW	21
1.06	Nd^{+3}	Eastman Kodak "Optical Glass"	$4F_{3/2} \rightarrow 4I_{11/2}$	300°K, Pulsed	21
1.06	Nd^{+3}	SiO_2 59% BaO_2 25% K_2O 15% Sb_2O_3 17%	$4F_{3/2} \rightarrow 4I_{11/2}$		48
1.06	Nd^{+}	$CaMoO_4$	$4F_{3/2} \rightarrow 4I_{11/2}$	77-300°K, Pulsed	21
1.060	Nd^{+}	BaF_2	$4F_{3/2} \rightarrow 4I_{11/2}$	77°K	

Wave Length	Element	Host	Transition	Remarks	Reference
1.06	Nd^{+3}- Yb^{+3}	LiMgAlSI		77°K, Pulsed	21
1.0607	Nd^{+3}	$SrWO_4$	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.061	Nd^{+3}	Glass	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	300°K	12
1.0611	Nd^{+3}	$SrMoO_4$	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.0627	Nd^{+3}	$SrMoO_4$	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.063	Nd^{+3}	$CaWO_4$	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	Pulsed	15
1.063	Nd^{+3}	$SrWO_4$	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	295°K	24
1.0631	Nd^{+3}	LaF_3	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.0633	Nd^{+3}	LaF_3	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	295°K	24
1.064	Nd^{+3}	LaF_3	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	38
1.064	Nd^{+3}	BaR_2	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	38
1.0641	Nd^{+3}	$CaWO_4$	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°k	24
1.0643	Nd^{+3}	$SrMoO_4$	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	300°K	12
1.065	Nd^{+3}	$CaWO_4$	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	85°K, CW	22, 60
1.0652	Nd^{+3}	$CaWO_4$	${}^4F_{3/2} \rightarrow {}^4I_{11/2}$	295°K	24

Wave Length	Element	Host	Transition	Remarks	Reference
1.0652	Nd^{+3}	$SrMoO_4$	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.066	Nd^{+3}	$CaWO_4$	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.067	Nd^{+3}	$CaMoO_4$	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	77°K	24
1.0673	Nd^{+3}	$CaMoO_4$	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	295°K	24
1.0703	Nd^{+3}	Y_2O_3		77°K	61
1.078	Nd^{+3}	Y_2O_3		77°K	61
1.085	Nd^{+3}	$CaWO_4$		300°K	60
1.10	Nd^{+3}	Scheelites, Fluorides, and Glass		295°K, CW	13
1.10	Pr^{+3}	$CaWO_4$ $SrMoO_4$		77°K	13
1.1153	Tm^{+2}	CaF_2	$^2F_{5/2} \rightarrow F_{7/2}$	20°K, CW	24, 38
1.37	Nd^{+3}	Borate glass	$^4F_{3/2} \rightarrow {}^4I_{13/2}$	300°K	83
1.61	Er^{+3}	$CaWO_4$		77°K	21
1.189	Tm^{+2}	CaF_2		4.2°K	22
1.612	Eu^{+2}	$CaWO_4$		77°K	18

Wave Length	Element	Host	Transition	Remarks	Reference
1.62	Ni^{+2}	MgF_2			51
1.612	Er^{+3}	$CaWO_4$	$4I_{13/2} \rightarrow 4I_{15/2}$	77°K	15
1.9	Tm^{+3}	$CaWO_4$ CaF_2 SrF_2		77°K	13
1.911	Tm^{+3}	$CaWO_4$	$3H_5 \rightarrow 3H_6$	77°K, Pulsed	15, 24, and 12
1.916	Tm^{+3}	$CaWO_4$	$3H_4 \rightarrow 3H_6$	77°K, Pulsed	24, 15
1.95	Ho^{+3}	LiMgAlSi		77°K, Pulsed	21
1.972	Tm^{+3}	SrF_2	$3H_4 \rightarrow 3H_6$	77°K	24
2.0	Ho^{+3}	Glass		77°K	13
2.046	Ho^{+3}	$CaWO_4$	$5I_7 \rightarrow 5I_8$	77°K, Pulsed	12
2.059	Ho^{+3}	$CaWO_4$	$5I_7 \rightarrow 5I_8$	77°K, Pulsed	4, 24
2.092	Ho^{+3}	CaF_2	$5I_7 \rightarrow 5I_8$	77°K	24
2.223	U^{+3}	CaF_2	$4I_{11/2} \rightarrow 4I_{9/2}$	77°K	15, 22
2.36	Dy^{+2}	CaF_2	$5I_7 \rightarrow 5I_8$	90°K, CW	13, 15, and 38

Wave Length	Element	Host	Transition	Remarks	Reference
2.407	U^{+3}	SrF_2	$^4I_{1/2} \rightarrow {}^4I_{9/2}$	77°K, Pulsed	21, 22
2.438	U^{+2}	CaF_2		77°K, Pulsed	18
2.438	U^{+3}	CaF_2	$^4I_{11/2} \rightarrow {}^4I_{9/2}$	77°K, Pulsed	15
2.49	U^{+3}	CaF_2		77°K, Pulsed	22
2.5	U^{+3}	CaF_2, SrF_2, BaF_2		77°K, CW in CaF_2	13
2.511	U^{+3}	CaF_2	$^4I_{11/2} \rightarrow {}^4I_{9/2}$	77°K, Pulsed	15
2.556	U^{+3}	CaF_2		Pulsed	4
2.556	U^{+3}	BaF_2	$^4I_{11/2} \rightarrow {}^4I_{9/2}$	Pulsed	4
2.60	U^{+3}	BaF_2	$^4I_{11/2} \rightarrow {}^4I_{9/2}$	77°K	38
2.613	U^{+2}	CaF_2		77°K, Pulsed and CW	18, 38
2.613	U^{+3}	CaF_2	$^4I_{11/2} \rightarrow {}^4I_{9/2}$	300°K, Pulsed 100°K, CW	15, 12
2.700	U^{+3}	BaF_2	$^4I_{11/2} \rightarrow {}^4I_{9/2}$		46

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